

ADDITIONAL RECORDS OF STOMATOPOD CRUSTACEANS FROM ISLA DEL COCO AND GOLFO DE PAPAGAYO, EAST PACIFIC OCEAN

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Abstract.—Four species of stomatopod crustaceans are reported from Isla del Coco, East Pacific Ocean: *Gonodactylus zaca*e Manning, 1972; *Pseudosquilla adia*stalta Manning, 1964; *Crenatosquilla oculinova* (Glassell, 1942); and *Heterosquilloides m*ccullochae (Schmitt, 1940). Three of the species, *G. zaca*e, *C. oculinova*, and *H. m*ccullochae, are reported from Isla del Coco for the first time. The only other stomatopod known from there is *Neocoronida cocosiana* (Manning, 1972). A monodactyla postlarva, tentatively assigned to *P. adia*stalta, is briefly characterized and illustrated. Records from the Golfo de Papagayo, Costa Rica, of *Squilla panamensis* Bigelow, 1891, and the poorly known *S. biformis* Bigelow, 1891, are also presented. The original definition of *Crenatosquilla* Manning, 1984, contained errors that are corrected here. *Heterosquilloides m*ccullochae is shown to differ from the current definition of every family in the superfamily to which the species is assigned.

Isla del Coco is an isolated oceanic island located at 5°32'57"N, 86°59'17"W, approximately 500 km southwest of Costa Rica and 630 km northeast of the Galápagos Archipelago (see Bakus 1975, Hogue & Miller 1981, and Abele & Kim 1984 for general information, biogeography, and ecology of the island; see Hertlein 1963 for faunal checklist and bibliography). Although the molluscan fauna of Isla del Coco has been extensively sampled (e.g., Hanna & Hertlein 1938, Hertlein 1963, Shasky 1983), little effort has been directed toward surveying the Stomatopoda until now. Collections made during 1932-1933 and 1938 by the R/V *Velero III* of the Allan Hancock Foundation, University of Southern California (AHF), proved that a rich crustacean fauna existed on and around the island, but no stomatopods were collected (John S. Garth and Janet Haig, AHF, pers. comm.). Hertlein (1963) reported fifty species of Crustacea from the island, but none were stomatopods. Few additional species of crustaceans have been reported from Isla

del Coco since that time (Manning 1972, Abele & Kim 1984).

Forty-two species of stomatopods are known to occur in the tropical eastern Pacific (Salgado-Barragán & Illescas-Monteroso 1987:159). Reaka & Manning (1980) reviewed the stomatopod fauna of Pacific Costa Rica and nearby offshore islands. They listed only two species known from Isla del Coco: *Neocoronida cocosiana* (Manning, 1972), the only stomatopod endemic to the island, and *Pseudosquilla adia*stalta Manning, 1964, the only species of *Pseudosquilla* known from the East Pacific Region (Reaka & Manning 1987:15).

In 1988 one of us (HGK) participated in a general collecting expedition to Parque Nacional Isla del Coco (Fig. 1) aboard the schooner M/S *Victoria af Carlstad*. The present report is principally based on small collections of stomatopods taken during that trip by personnel from the Natural History Museum of Los Angeles County (LACM) using SCUBA (3-43 m depths). Also included in this note are specimens collected

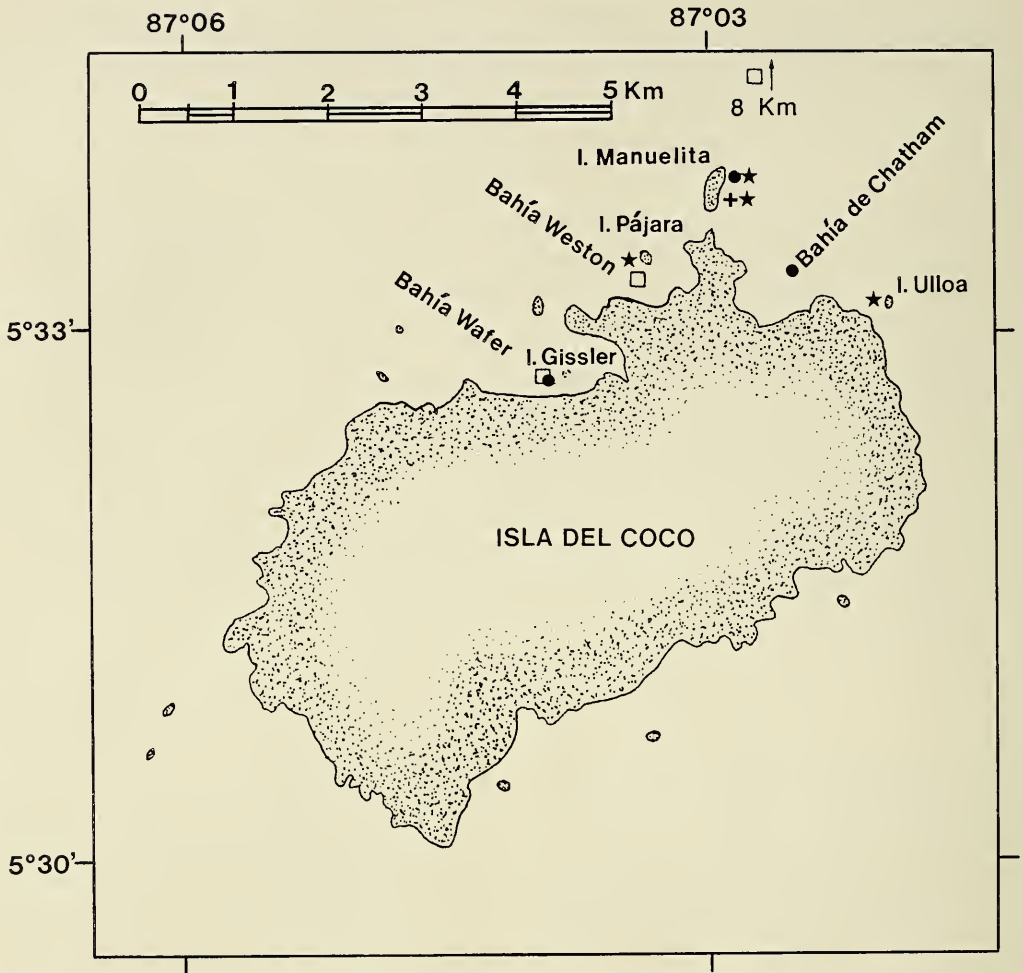


Fig. 1. Isla del Coco, showing sites at which stomatopods were collected. Closed circle = *Gonodactylus zacaе*; Open square = *Pseudosquilla adiastrata*; Cross = *Crenatosquilla oculinova*; Star = *Heterosquilla mccullochae*.

at Isla del Coco by Kirstie Kaiser, Michel Montoya, and Douglas von Kriegelstein using trawl, dredge, and tangle net (18–46 m depths) during March 1989 and donated to LACM. Finally, specimens captured by trawling (66–276 m depths) in the Golfo de Papagayo, Costa Rica (Fig. 2), by William Bussing aboard the Japanese vessel R/V *Nisshin Maru* during 1987–1988 are listed.

The waters at Isla del Coco abound with suitable habitats for stomatopods. During the 1988 trip, inclement weather prevented collecting anywhere but in and around the protected bays of the north side of the is-

land. Specimens reported here were found in several habitats. Some specimens were collected in sand and rubble beneath dead patches of the coral *Porites lobata* Dana, 1846. Others were collected from deep within the branches of living colonies of the much less abundant *Pocillopora capitata* Verrill, 1864. Many specimens were found in the medium-grained, light brown to white sand under basaltic rocks in the wide talus zones at the bases of the many islets surrounding Isla del Coco. The sheer rock walls of some islets and seamounts have many crevices and holes with stomatopods, but

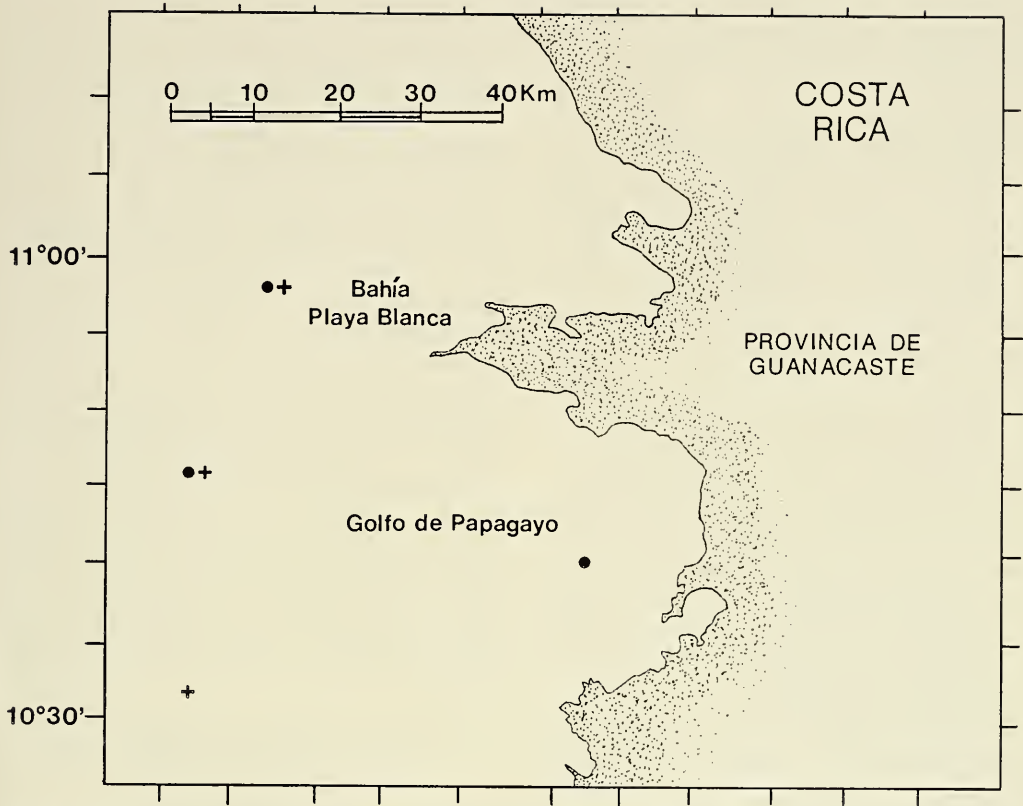


Fig. 2. Golfo de Papagayo, Pacific coast of Costa Rica, showing sites at which stomatopods were collected. Cross = *Squilla biformis*; Closed circle = *Squilla panamensis*.

specimens are difficult to collect because of the depth to which the stomatopods recede within the crevices and because of the strong currents in those habitats, which make diving difficult.

Carapace length (cl) is measured on the midline and does not include the rostral plate, but total length does include the plate. All specimens have been deposited at LACM and at the Florida Marine Research Institute, Marine Invertebrate Collection (catalog number prefix FSBC I).

Family Gonodactylidae Giesbrecht, 1910
Gonodactylus zaca Manning, 1972

Material.—Isla del Coco: Northeast of Isla Manuelita, seamount, 5°33.88'N, 87°02.78'W, depth 18–43 m; leg. H. G. Kuck

and A. Jahn, 29 Apr 1988; 1 male, cl = 2.5 mm; LACM 88-38.1.—Bahía Wafer, *Porites* reef, east side of Isla Gissler, 5°32.8'N, 87°03.82'W, depth 3–6 m; leg. H. G. Kuck and R. W. Peck, 25 Apr 1988; 1 female, cl = 4.3 mm; FSBC I 34187 (LACM 88-12).—Bahía de Chatham, depth 46 m; leg. K. Kaiser, 26 Mar 1989; 1 male, cl = 2.7 mm; LACM 89-28.1.

Remarks.—The specimens reported here agree well with the illustrations of *G. zaca* presented by Manning (1974:fig. 1), except that the lateral margins of the ocular scales are not as concave as those he depicted. The species has not been reported before from Isla del Coco, but its occurrence there is not surprising. *Gonodactylus zaca* is thought to be the most widely distributed gonodactylid and the most common *Gonodactylus*

in the East Pacific Region (Manning 1974: 104, Reaka & Manning 1980:9).

Family Pseudosquillidae Manning, 1977
Pseudosquilla adialtata Manning, 1964

Material.—Isla del Coco: Bahía Wafer, *Porites* reef, east side of Isla Gissler, 5°32.8'N, 87°03.82'W, depth 3–6 m; leg. H. G. Kuck and R. W. Peck, 25 Apr 1988; 1 male, 2 females, cl = 4.6–6.7 mm; LACM 88-12.1.—Bahía Weston, *Porites* reef, southwest side of Isla Pajara, 5°33.28'N, 87°03.45'W, depth 9–15 m; leg. R. W. Peck and H. G. Kuck, 27 Apr 1988; 1 male, cl = 14.8 mm; FSBC I 34188 (LACM 88-23).—Approx. 8 km north of Bahía de Chatham, 5°38.0'N, 87°02.55'W, from stomach of yellowfin tuna *Thunnus albacares* (Bonnaterre, 1788) (approx. length 1 m, approx. weight 165 kg, hook and line); leg. M. Dell' Aquila, 30 Apr 1988; 1 monodactyla postlarva, cl = 4.4 mm; LACM 88-41.1

Remarks.—The subadult male with carapace length 4.6 mm (LACM 88-12.1) lacks the two large patches of dark chromatophores on the carapace that are usually characteristic of adults (see Manning 1964:fig. 1). The white spots on that specimen are relatively larger than similar spots on adults and are positioned evenly over the dorsal surface of the entire body.

We have assigned to this species the postlarva (LACM 88-41.1) found in the stomach contents of a tuna caught north of Isla del Coco, even though the specimen is not in good condition and the postlarval stage of *P. adialtata* has never been described. Manning (1969) reviewed the morphological characteristics of postlarvae of the Atlantic species *P. ciliata* (Fabricius, 1787) and *P. oculata* (Brullé, 1837). The specimen from off Isla del Coco differs from *P. ciliata* in the same way that *P. oculata* does (see Manning 1969:270, 277). The specimen is more similar to the postlarva of *P. oculata*, which shares the following characteristics. Total

length of the specimen is 25 mm. The eyes are large, with broadened cornea, and the rostral plate is cordiform (Fig. 3a). The sixth abdominal somite has submedian spines but lacks intermediate spines (Fig. 3b). The median cleft of the telson is pronounced. The outer margin of the uropod is armed with ten movable spines, and the proximal segment of the outer ramus of the uropod is more than three times the length of the distal segment (Fig. 3b, d). The outer spine of the basal prolongation of the uropod is longer than the inner, and the inner margin of the outer spine of the prolongation is angled. There are posterolateral spines on the fifth and sixth abdominal somites; however, unlike the postlarva of *P. oculata*, the fourth somite is acutely angled posterolaterally and lacks a spine (Fig. 3c). A complete description of the postlarva of *P. adialtata* must await collection of more suitable material from the area.

Family Squillidae Latreille, 1803
Crenatosquilla oculinova
 (Glassell, 1942)

Material.—Isla del Coco: East side of Isla Manuelita, depth 18 m; leg. M. Montoya and K. Kaiser, 21 Mar 1989; 1 female, cl = 5.1 mm; LACM 89-29.1.

Remarks.—The specimen agrees well with Glassell's (1942) description of the species. Manning (1984) erected the monotypic genus *Crenatosquilla* for *Squilla oculinova*. His definition of *Crenatosquilla* contained two errors: 1) specimens of *C. oculinova* have three epipods on the maxillipeds, not four as Manning stated; and 2) the dorsal ridge of the carpus of the raptorial claw, rather than being indistinct, is prominent and ends in a distal tooth (see Glassell 1942:54).

Crenatosquilla oculinova has not been reported before from Isla del Coco. Reaka & Manning (1980:16) reported the species to be the most common stomatopod collected in their study of Pacific Costa Rica.

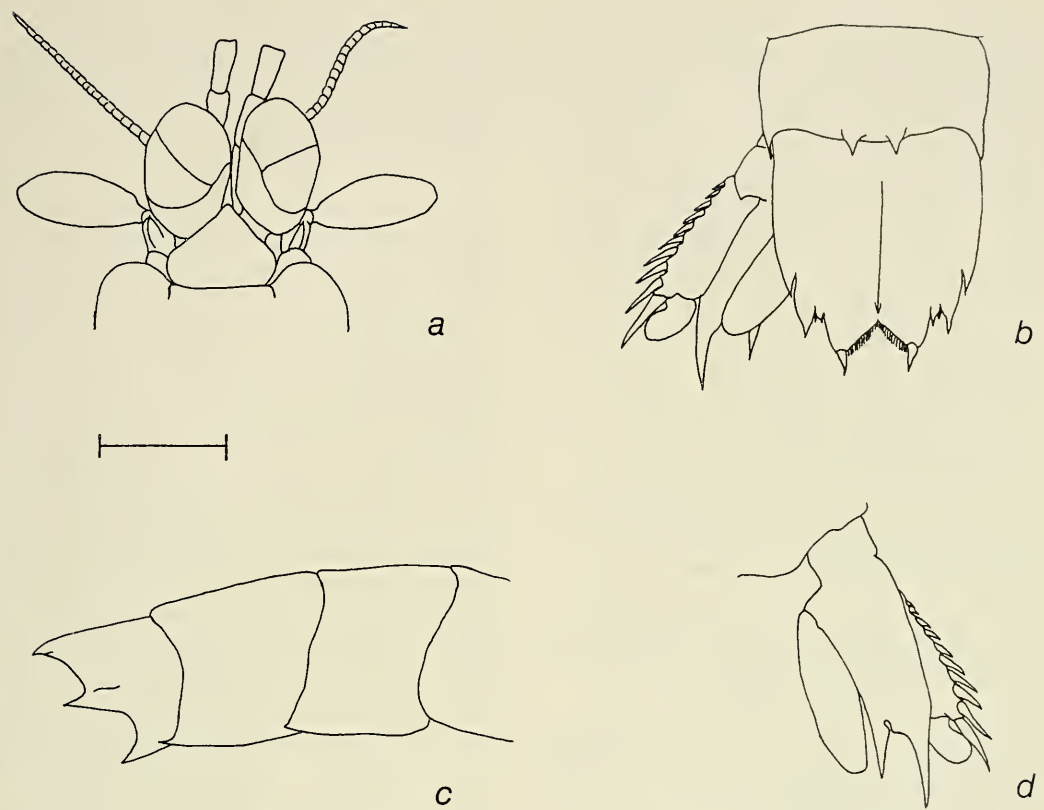


Fig. 3. *Pseudosquilla adialtalta* postlarva, LACM 88-41.1: a, Anterior portion of body, dorsal view, setae and antennular flagella omitted; b, Sixth abdominal somite, telson and left uropod, dorsal view, setae omitted; c, Abdominal somites 3–6, lateral view of right side; d, Left uropod, ventral view, setae omitted. (Scale line = 2 mm.)

Squilla biformis Bigelow, 1891

Material. —Costa Rica, Provincia de Guanacaste: Golfo de Papagayo, 10°45.0'N, 86°12.0'W–10°46.2'N, 86°13.0'W, depth 206–208 m; leg. W. Bussing, R/V *Nisshin Maru*, 7 Dec 1987; 1 female, cl = 28.3 mm; FSBC I 34185 (LACM 87-217).—Golfo de Papagayo, 10°30.5'N, 86°13.6'W–10°32.0'N, 86°14.6'W, depth 268–276 m; leg. W. Bussing, R/V *Nisshin Maru*, 10 Dec 1987; 2 females, 1 male, cl = 30.5–33.2 mm; LACM 87-216.1.—Bahía Playa Blanca, northwest of Golfo de Papagayo, 10°58.4'N, 86°07.5'W–10°00.1'N, 86°08.1'W, depth

131–139 m; leg. W. Bussing, R/V *Nisshin Maru*, 9 Jan 1988; 1 female, cl = 30.8 mm; LACM 88-108.1.

Remarks.—*Squilla biformis* is captured infrequently despite its rather wide distribution in the tropical East Pacific. It has been reported only from the Golfo de California, the Golfo de Panamá, and off Peru (Manning 1974:108).

Squilla panamensis Bigelow, 1891

Material. —Costa Rica, Provincia de Guanacaste: Golfo de Papagayo, 10°45.0'N, 86°12.0'W–10°46.2'N, 86°13.0'W, depth

206–208 m; leg. W. Bussing, R/V *Nisshin Maru*, 7 Dec 1987; 1 male, cl = 24.2 mm; FSBC I 34186 (LACM 87-217).—Golfo de Papagayo, 10°40.7'N, 85°46.3'W–10°42.1'N, 85°47.2'W, depth 66–67 m; leg. W. Bussing, R/V *Nisshin Maru*, 13 Nov 1987; 2 females, cl = 14.9–approx. 22 mm (latter damaged), 1 female abdomen and telson only, 1 male, cl = 22.7 mm; LACM 87-214.1.—Bahía Playa Blanca, northwest of Golfo de Papagayo, 10°58.4'N, 86°07.5'W–10°00.1'N, 86°08.1'W, depth 131–139 m; leg. W. Bussing, R/V *Nisshin Maru*, 9 Jan 1988; 1 female, 1 male (abdomens and telsons only); LACM 88-108.1

Remarks.—This species is known from Bahía Petatlán, México, to Tumbes, Peru (Manning 1974:108).

Family Lysiosquillidae Giesbrecht, 1910

Heterosquilloides mccullochae

(Schmitt, 1940)

Material.—Isla del Coco: *Porites* reef, northeast side of Isla Manuelita, 5°33.87'N, 87°02.12'W, depth 12–20 m; leg. R. W. Peck and H. G. Kuck, 26 Apr 1988; 2 females, cl = 10.6–14.8 mm; LACM 88-19.1.—*Porites* reef, east side of Isla Manuelita, 5°33.8'N, 87°02.07'W, depth 9–12 m; leg. H. G. Kuck and R. W. Peck, 26 Apr 1988; 1 male, cl = 10.3 mm; LACM 88-20.1.—Bahía Weston, west side of Isla Pajara, 5°33.48'N, 87°03.40'W, depth 21 m; leg. K. Burke, 27 Apr 1988; 1 male, cl = 9.8 mm; LACM 88-24.1.—Bahía de Chatham, boulder talus zone at base of wall, west side of Isla Ulloa, 5°33.20'N, 87°02.07'W, depth 8–26 m; leg. R. W. Peck, H. G. Kuck, and M. Dell' Aquila, 29 Apr 1988; 1 female, cl = 13.8 mm; FSBC I 34189 (LACM 88-36).

Remarks.—The specimens agree well with descriptions of the species published by Schmitt (1940:197) and Manning (1969:55); all have the distinctive chromatophore pattern illustrated by Schmitt. *Heterosquilloides mccullochae*, although relatively uncommon, has the widest distribution of any

stomatopod (Reaka & Manning 1987:15). It is a circumtropical species, known from the East Pacific, West Atlantic, Central Atlantic (Ascension Island), and Indian oceans (Reaka & Manning 1980:11, 1987:15).

A new family might have to be erected to receive this species. Manning (1980:367–368) revised the superfamilies, families, and genera of Recent stomatopods. Characters of *Heterosquilloides mccullochae* do not fit the definition of any of the three families (Lysiosquillidae, Coronididae, and Nannosquillidae) that he placed within the superfamily Lysiosquilloidea, nor do the characters fit the more recently discovered Erythrosquillidae, also tentatively placed in the Lysiosquilloidea (see Manning & Bruce 1984:332). *Heterosquilloides mccullochae* differs from members of the Lysiosquillidae and the Erythrosquillidae by having the endopods of the first two walking legs subcircular rather than slender and strap-like, from members of the Nannosquillidae by lacking a proximal fold on the outer margin of the uropodal endopod, and from members of the Coronididae by lacking the basal inflation of the dactylus of the raptorial claw. Because of the morphological characteristics and unusually broad distributional pattern of *Heterosquilloides mccullochae*, the species is certainly unique within the Lysiosquilloidea.

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